Transporta nelaimes gadījumu un incidentu izmeklēšanas birojs

Transport Accident and Incident Investigation Bureau of the Republic of Latvia

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FINAL REPORT No. 4-02/1-16(1/2017)

INVESTIGATION SEPARATION MINIMA INFRINGEMENT BETWEEN THE AIRCRAFT LANCAIR EVOLUTION, REGISTRATION N503AL and AIRCRAFT Boeing B738, flight RYR-55RM IN RIGA FIR (56°45′09″N 023°08′43″E) ON APRIL 21, 2016.

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9. Sector "APP" workload;
10. Private pilot licence 3809497;
11. Medical certificate third class GX-1265614;
12. "ATM OCCURRENCE PRELIMINARY REPORT"

Abbreviations

ATCC - Air Traffic Control Centre

ACC - Area Control Center

ATRACC- ATC System for Riga Area Control Centre Guidance and Control System

ACFT - Aircraft

ATC - Air Traffic Control

UTC - Universal Time Coordinated

AoR - Area of Responsibility

NM - Nautical mile

FT - Feet

FIR - Flight Information Region

ATS - Air Traffic Services

FL - Flight Level

Synopsis

Unless stated otherwise the time in this Report is UTC

On Monday, April 25, 2016 TAIIB (Transport Accident Investigation Bureau of the Latvian Republic) received from the State Joint Stock Company „Latvijas gaisa satiksme" (LGS) the "ATM OCCURRENCE PRELIMINARY REPORT" that on Thursday, April 21, 2016 at 07:20 an occurrence had taken place (separation minima infringement) in Riga Flight Information Region (FIR), Class C airspace, airspace type TMA, location of occurrence (56°45′09″N 023°08′43″E), where aircraft Boeing 738, flight RYR-55RM and private aircraft Lancair Evolution, registration N503AL were involved.

Ryanair, Boeing 738 was on scheduled flight from Manchester International Airport (EGCC), United Kingdom, approaching to Riga International Airport (EVRA). Lancair Evolution, registration N503AL took its departure from Latvia/ZZZZ(TUK) to Austria (LOIH) according to submitted flight plan.

Initially RYR-55RM, after first contact with APP controller, was cleared to descend to FL70, no speed restriction below FL100, distance between aircraft was 22,4NM. The pilot of N503AL informed APP controller that he flies according to IFR, proceed via flight plan to point ERIVA and got instruction from controller to set squawk 4325 for identification. When radio location identification was established N503AL was cleared by APP controller to initial climb to FL100, to proceed from present position direct to RIA and to expect vectors for spacing.

For interval increasing between aircraft APP controller changed N503AL flight route from present position, giving instruction to fly to point ERIVA as well as changed RYR-55RM flight level giving the crew instruction to change flight level decreasing from FL70 to FL110. According to SSR Mode S information both aircraft were established controllers given flight levels and she switched her attention to other aircraft.

When STCA signal triggered and warned about separation norm infringement possibility, APP controller noticed that N503AL didn't hold cleared flight level 100 and continued climbing to flight level 106. Divergence of N503AL from determined horizontal and vertical separation interval (level bust) was a result infringement of separation standards between aircraft Boeing 738 flying at cleared flight level 110 (actual flight level was 111). Minimum horizontal separation was 1.9NM, minimum vertical separation recorded was 500FT.

Investigation

TAIIB Authorities classified the occurrence as a serious incident and initiated an investigation under the provisions of Annex 13 to the Convention on International Civil Aviation (Chicago 1944) and the REGULATION (EU) No 996/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation, forwarded request to air traffic service provider LGS for providing any relevant available information regarding to the incident and personnel data of controller involved in the serious incident as well as to pilot of aircraft Lancair Evolution, registration N503AL.

1. Factual information

1.1. Sequence of events with sector Riga "Approach" Controller

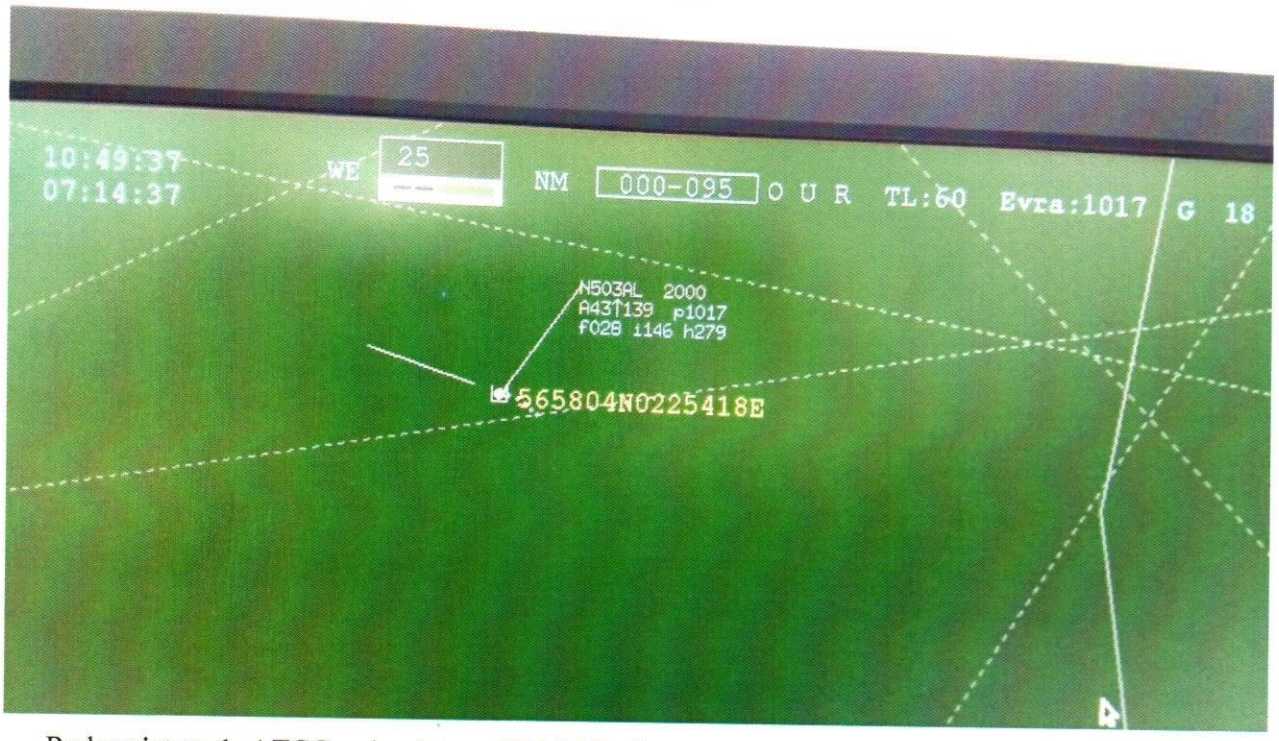
According to ATCC duty roster on April 21, 2016 the APP Controller's working time with role as Approach Executive (AE) was from 07:30 till 15:00 local time (04:30 till 12:00 UTC) at seven hour shift No1.

She had reported for duty as APP Executive (AE) and logged in the ATRACC+ system at 04:36:22 UTC and had been at her working position for 53 (fifty three) minutes and 21 sec, after that had break. After break APP controller logged in the ATRACC+ system at 06:31:50 and was in AE working

position at 07:20:53 when the occurrence occurred 00hrs 49min 03sec after break time. Break time before accident was 1hour 2min 7sec at 07:20:53, total working time 1 hour 51 min 10sec.

At **07:14:37** involved in the incident aircraft N503AL, crossing level 4200FT, established first radio contact with the APP Controller on frequency 129,925MHz: *"**Riga "Approach" N503AL**"*. At that moment aircraft was flying in controlled airspace already (see Figure 1)

The Controller approved radio contact: *"**N503AL Riga "Approach" Go ahead**"*



Radar picture 1. ATCC radar data at 07:14:37 when NA503AL established first contact with APP Controller

At **07:14:47** the pilot of N503AL established radio contact with the APP Controller and declared *"**N503AL proceed via flight plan to point ERIVA**"*.

The APP Controller for aircraft identification gave SSR code (squawk)**:***"**N-AL for identification set squawk 4325**"*

The pilot of N503AL confirmed instruction: *"**4325 squawk N-AL.**"*

At **07:15:26** the crew of RYR-55RM declared of entering in controlled zone: "Riga Approach very good morning, RYR55RM descending flight level 130 to PEVEK, speed is 2... knots"

APP Controller gave to crew following instruction: "RYR55RM Riga Approach good morning, radar contact, continue present heading, descend FL70, no speed restrictions below FL100"

The crew of RYR55RM confirmed instruction: "Continue present heading, descending FL70, free speed after below 100, RYR55RM"

At **07:15:53** the Controller requested N503AL: *"**N503AL radar contact and confirm the altitude you climbing.**"*

The pilot of N503AL answered: *"**Flight level 240.**"*

At **07:16:03** the controller cleared N503AL *"**N-AL initial climb flight level 100**"*

The pilot of N503AL confirmed: ***"Initial flight 100. N503AL."***

At **07:16:14** the Controller requested N503AL: ***"N-AL confirm are you flying IFR or VFR now."***

The pilot of N503AL answered: ***"We fly IFR. N-AL."***

The Controller confirmed: ***"Copied"***

At **07:16:58** the Controller gave instruction to pilot of N503AL **"N-AL from present direct to RIA"**

Radar picture 2.

The pilot of N503A answered: ***"Say again, please for -AL."***

At **07:17:07** the Controller repeated clearance: ***"N503AL direct RIA expect vectors for spacing."***

At **07:17:14** the pilot confirmed clearance:" **Direct to RIA.N503AL".**

At 07:17:24 the controller gave instruction to other aircraft involved in the incident - RYR-55RM to change flight level decreasing from FL70 to FL110: "RYR55RM re-cleared FL 110, I call you back for further descent"

At 07:17:30 The crew confirmed clearance: "Descent flight level 110 RYR55RM"

Radar picture 3.

N503AL **at 07:17:24** was flying in the controlled airspace to direction ERIVA, but no direct to RIA as according to flight plan as well as according by Controller clearance.

Radar picture 4.

At 07:17:42 the controller gave instruction to crew of N503AL: "N503AL re-cleared direct to ERIVA from present position"

At 07:17:51 the crew of N503AL answered: "**Direct to RIA** from this position, please give the heading"

At At 07:17:54 the controller repeated clearance again: "NAL direct point ERIVA"

At 07:17:58 the crew confirmed clearance:" Direct point ERIVA, N503AL"

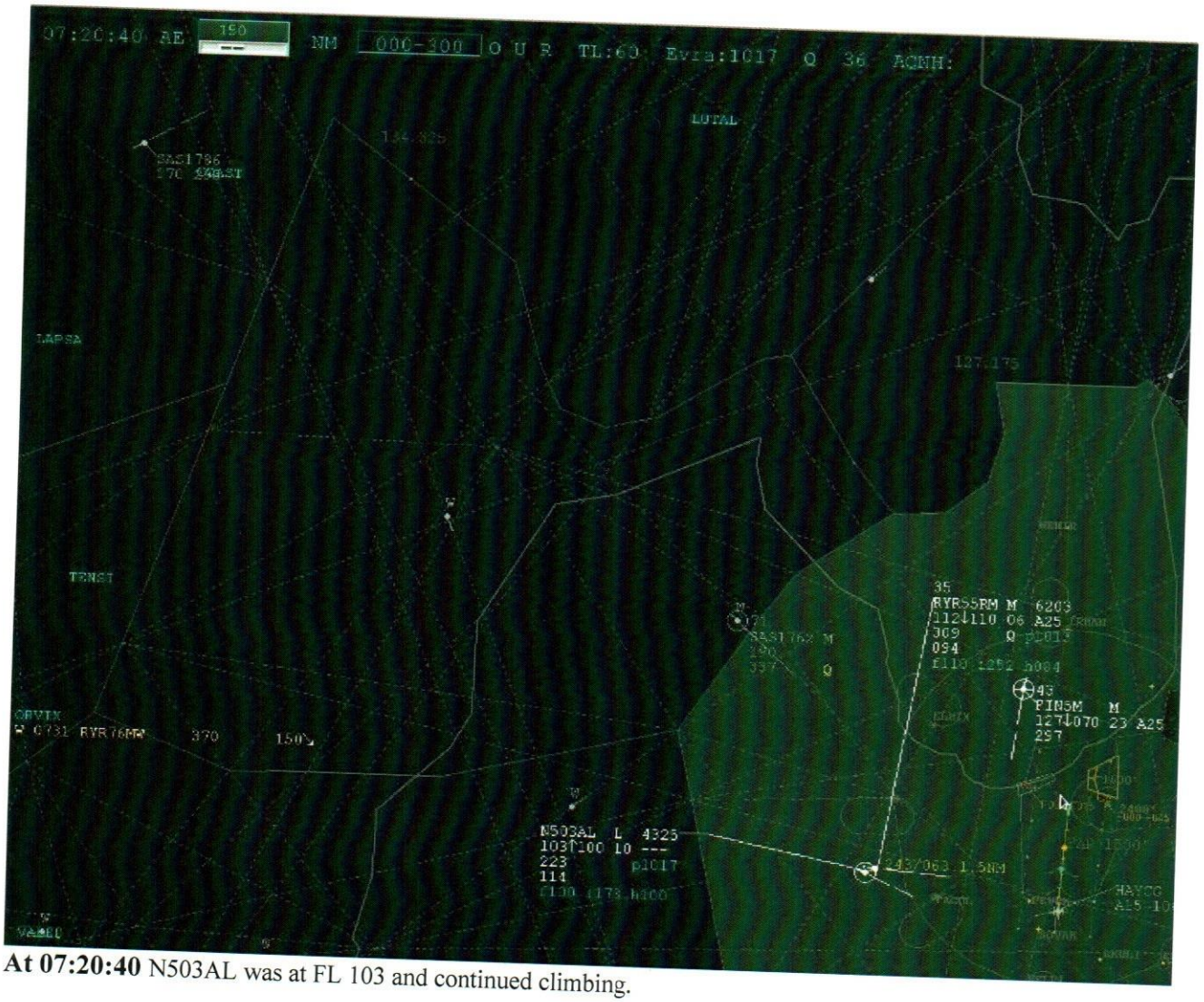
After that the controller communicated with other approaching aircraft.

At 07:19 29 N503AL was at FL 90 climbing to FL 100.

Radar picture 5.

At 07:20:20 N503AL was at FL 100 and continued climbing.

Radar picture 6.



At 07:20:40 N503AL was at FL 103 and continued climbing.

Radar picture 7.

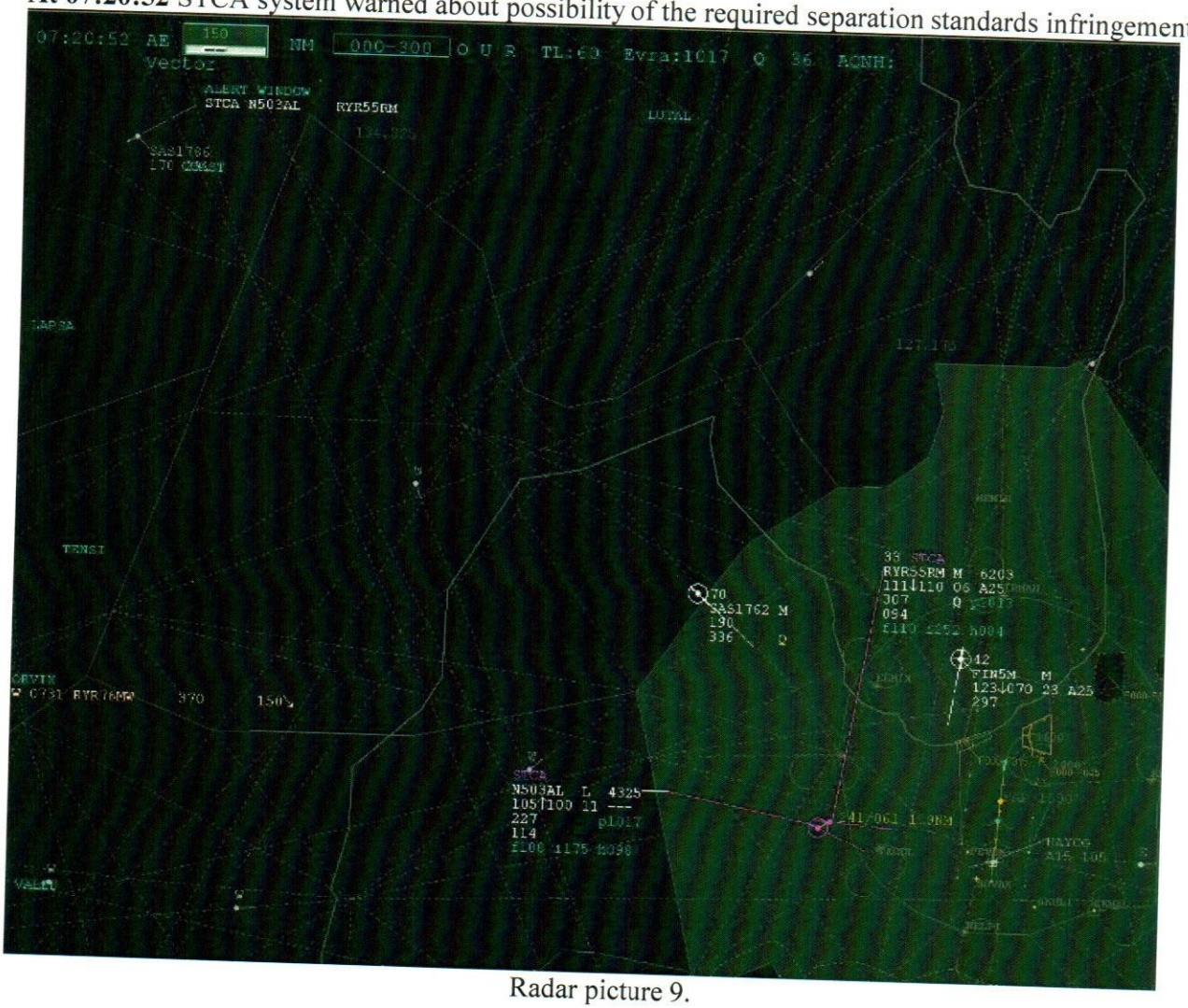
At 07:20:48 N503AL was at FL 105 and still continued climbing. Radar picture 8.

At 07:20:58 APP controller noticed that aircraft N503AL continue climbing (despite that Mode S still showed FL100). The controller immediately stopped work with other aircraft and gave instruction to the pilot of N503AL to maintain FL100 as well as advised about above flying aircraft: "N-AL maintain flight level 100, traffic above"

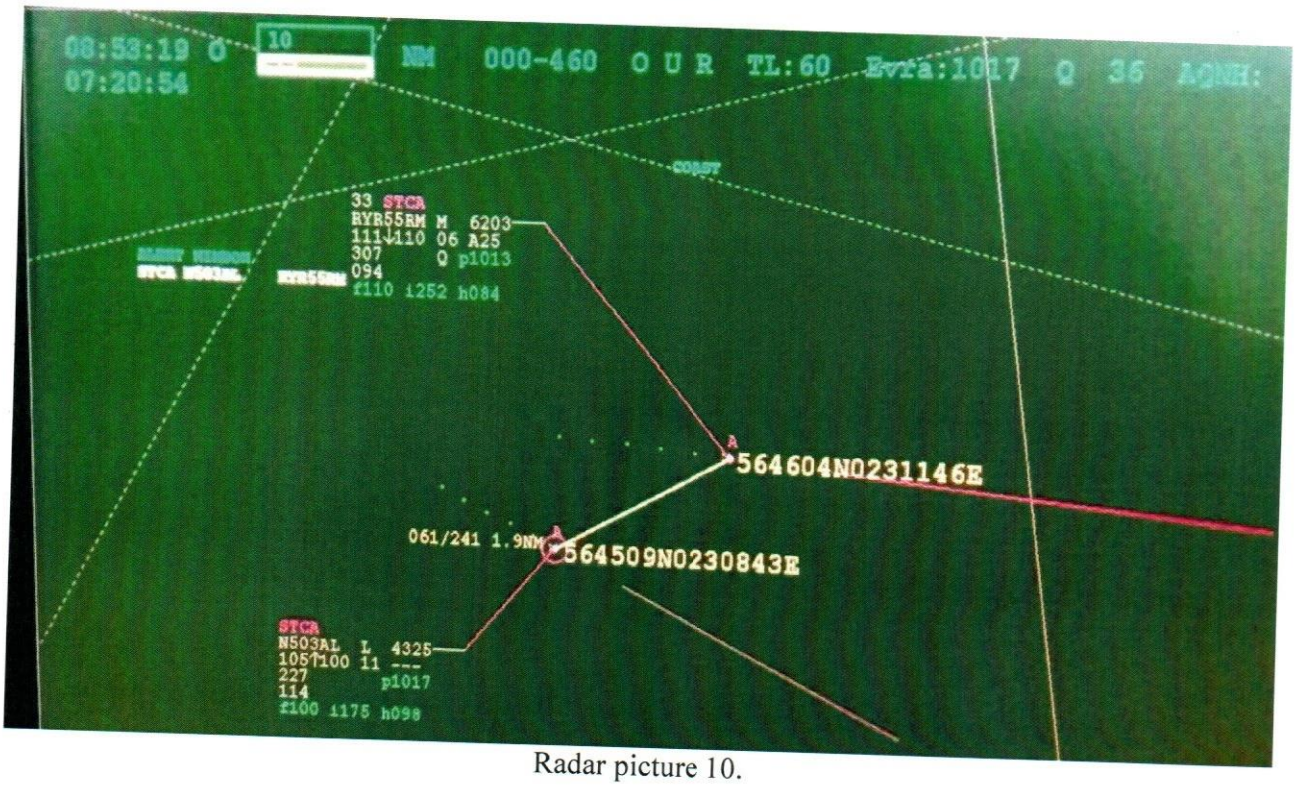
At 07:21:04 the pilot of N503AL confirmed instruction: "Maintain 100 due to traffic"

At that moment horizontal interval was **1.9 NM**, vertical **600FT** with a tendency to decline because aircraft still climbing (see radar picture No 7, 8) Separation standards were infringed between aircraft.

At 07:20:52 STCA system warned about possibility of the required separation standards infringement.



Radar picture 9.



Radar picture 10.

Radar separation between identified, controlled aircraft at the same flight level (altitude) when double SSR coverage is provided the radar separation **not less than 3 NM** shall be applied;

Radar picture 11.

The workload of "APP" sector at the time of incident was medium, 4 traffic were under jurisdiction of the APP Controller.

1.2. Injuries to persons

There were no injuries.

1.3. Damage to aircraft

Not damage occurred.

1.4. Other damage

Objects other than aircraft not damaged.

1.5. Personnel information

1.5.1. Pilot of aircraft Lancair Evolution

Male, 53 years old

Pilot Certificate 3809497, Date issue 22. February 2016 by FAA USA

Ratings: Airplane single engine land; Instrument airplane.

Medical certificate: Class 3

1.5.2. RIGA Sector "APPROACH" controller:

Female, 27 years old
Ratings: All necessary ratings were valid (Rating Certificate to Air Traffic Controller Licence valid);
Medical Certificate Class 3- valid.

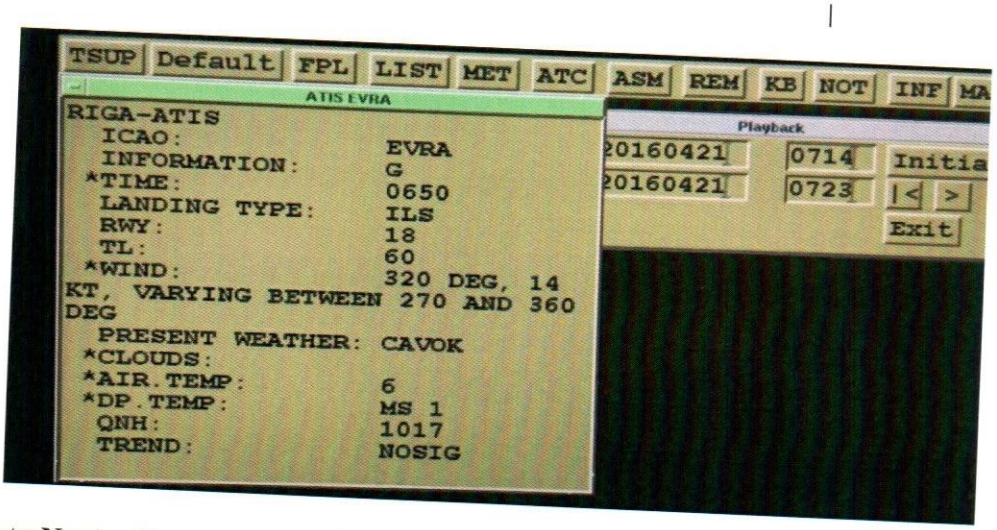
1.6. Aircraft information

Model – Lancair Evolution, Registered owner of aircraft- Pelegrin Northwest LLC;
Type Aircraft – Fixed wing, single engine, 4 seats, Serial No EVO 025

Engine - P&W CANADA PT6A-28 (Turbo-prop)
Horsepower: 680

Aircraft type – Boeing B738, owner of aircraft – Ryanair;

1.7. Meteorological information



1.8. Aids to Navigation

NIL

1.9. Communications

ATCC controllers provide communication with a computerized voice communication system using pre-set switching and distribution of various aeronautical frequencies and direct communication lines. Frequency 129.925 MHz for sector "APP" Controller used for pilot - controller communication. Co-ordination within Riga FIR shall be performed using available "ATRACC+" system functionality.

For the investigation the sector "APP" Controller's console's recordings on the frequency 129.925 MHz was used. The quality of the recordings was good. The controller's and crew members of N503AL and RYR55RM used standard phraseology and there had not principal errors in the used phraseology during communication.

1.10. Aerodrome information

NIL

1.11. Flight recorders

The incident reconstruction was based on radar information and voice communications transcript between sector "APP" Controller of Riga ATCC and both aircraft crew members involved in incident.

1.12.Wreckage and impact information

Not damage

1.13. Medical and pathological information

NIL

1.14. Fire

There was no fire

1.15. Survival aspects

NIL

1.16. Tests and research

NIL

1.17. Organizational and management information

According to Law on Aviation of the Republic of Latvia the authority responsible for activities of the utilizations of the airspace of the Republic of Latvia for civil and military needs and the flight of aircraft shall be controlled by the Air traffic control unit - the State Joint-Stock Company – "Latvijas Gaisa Satiksme - LGS" which is the Air Navigation Service (ANS) provider in the Republic of Latvia. Air traffic control has provided in the airspace of Riga FIR, by Latvian Air Navigation Services (LGS) staff.

Figure 3 Air navigation services rendering by "Latvijas Gaisa Satiksme - LGS"

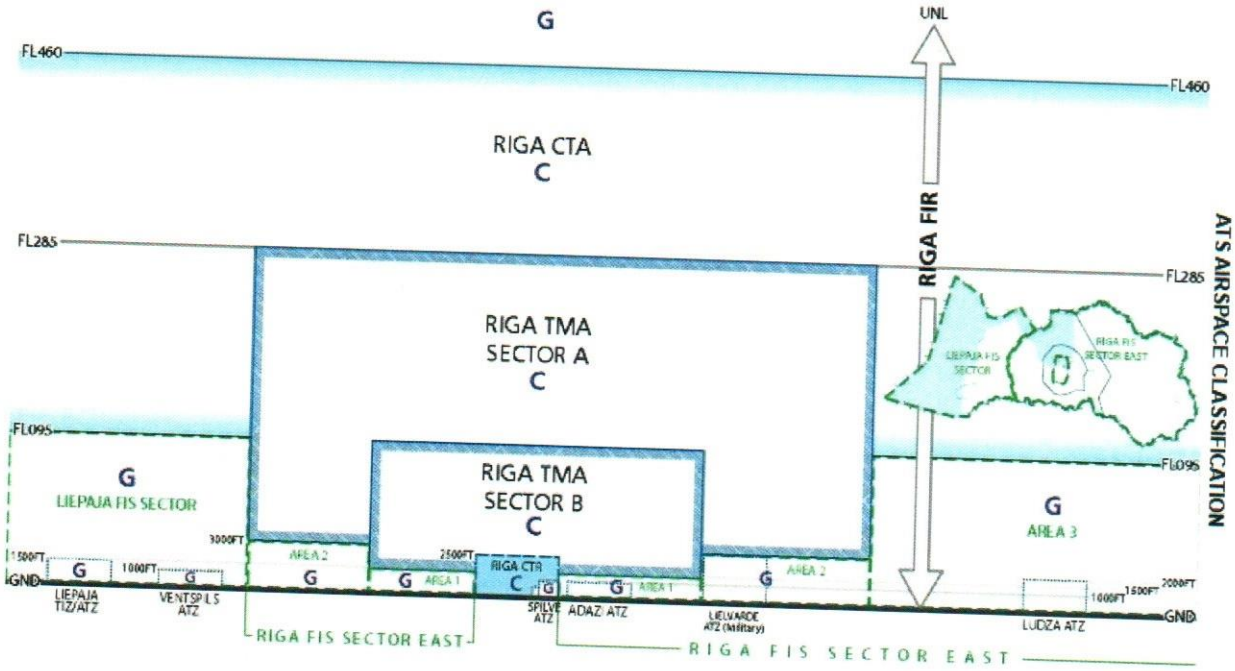


Figure 4 ATS AIRSPACE CLASSIFICATION

According to air traffic management Riga FIR is divided:

- Controlled area, managed by Riga Air Traffic Control Center and Aerodrome Region;
- Non controlled area.

According to Air Traffic Operative Control Riga FIR is divided:

Sector WEST;
Sector EAST;
Sector Approach;
CTR.
Taking into account air traffic intensity **Sector WEST** can be divided on **Sector NORTH** and **Sector South.**

1.18. Additional information

NIL

1.19. Useful or effective investigation techniques

NIL

2. Analysis

2.1. Introduction

The analysis based on the pilot of N503AL, sector "APPROACH" controller's actions, radio communications, radar recordings and Air traffic service's procedures analysis.

An each occurrence is usually the result of a sequence of events. All causes together form the necessary and sufficient adverse events or conditions for a particular occurrence. Therefore the

investigation of the serious incident – infringement of separation standards between the two aircraft N503AL and RYR55RM is based that at least one event was judged to be directly in the causal chain of events leading to this serious incident. Without that ATM event (or if there was a different order of events), the occurrence would not have happened.

The purpose of this investigation is reconstruction of the circumstances of flight in order to analyze, determine causal factors and develop recommendations on preventive actions.

2.2. The actions of the pilot of aircraft Lancair Evolution, registration N503AL

```
MFP905 201947
FF EVJAZTZX EVLAZTZX EVRAYDYD EVRAZPZX EVRRZDZX EVRRZQZX EVVAZTZX
201947 EUCHZMFP
(FPL-N503AL-ZG
-EVOT/L-SDGRY/S
-ZZZZ0630
-N0240F240 RIA/N0240F240 IFR Y130 ERIVA N994 ODLIT L71 BOKSU M857
SUW L29 GRUDA N858 DEKUT P861 GINOK/N0240F250 P861 RUDAP UQ227 MILKA
VFR DCT IAL061006
-LOIH0346 LSZR
-PBN/A1B2 DEP/JURMALA 5656N02313E DOF/160421 ORGN/KAUSZXBT
RMK/DEP/565600N0231300E FILED BY 00441273782130 CREW CONTACT
0037129211717)


MFP572 210715
FF EVJAZTZX EVLAZTZX EVRAYDYD EVRAZPZX EVRRZDZX EVRRZQZX EVVAZTZX
210715 EUCHZMFP
(DEP-N503AL-ZZZZ0715-LOIH-DOF/160421)
```

According to submitted Flight Plan the pilot has been flown from uncontrolled aerodrome by the following ATS routes situated within Riga APPROACH sector:Y130 (LAPSA-RIGA-ERIVA) and N994 (ERIVA-RIGSO-LUTAL).

If any flight departs from an uncontrolled Latvian aerodrome, airfield or heliport, after departure the pilot shall activate FPL (if submitted) and will report actual time of departure (ATD) via the nearest ATS unit. IFR flights departing from non-controlled aerodromes shall not enter Controlled airspace without prior arrangements with the Area Control Centre concerned.

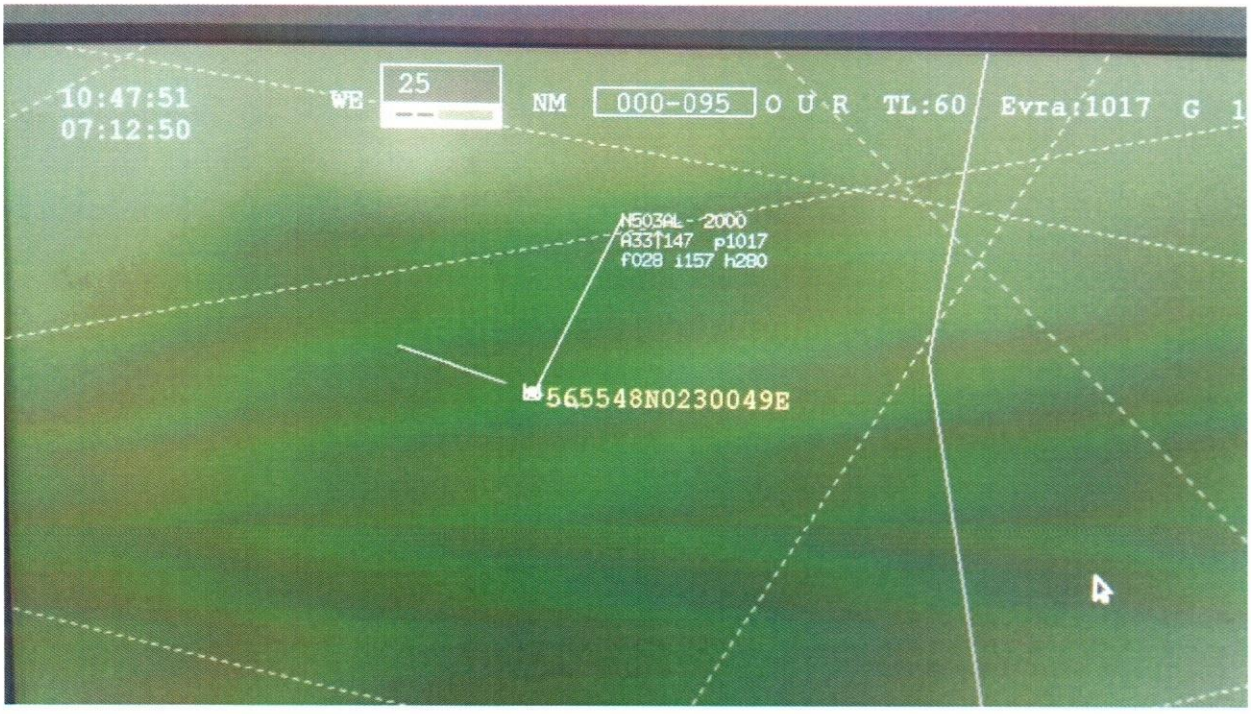
There was not report on the flight plan activation and the opening of departure from an uncontrolled aerodrome.

At **07:09:14** N503AL was flying already in the controlled airspace (565640N;0231314E)

Radar picture 12.

There was not report from pilot of N503AL on visual flight rules changes to instrument flight rules.

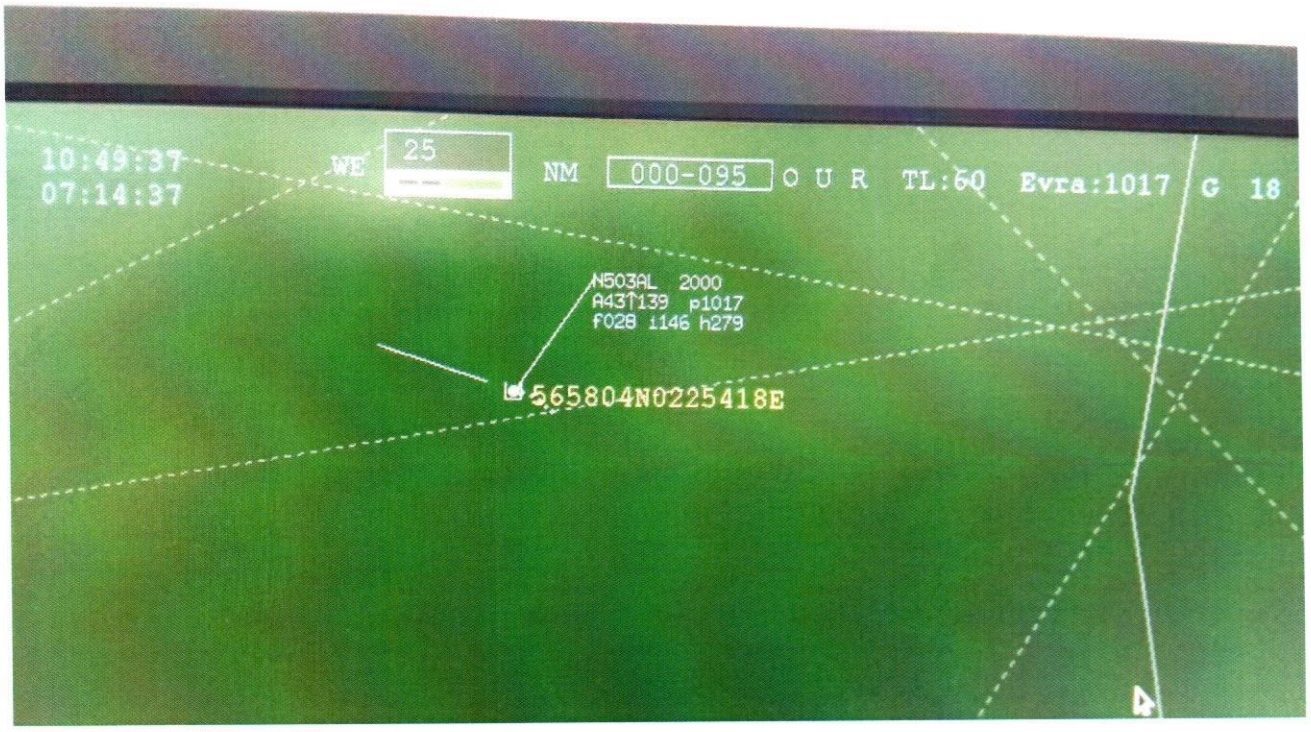
There was not request from pilot of N503AL for entry into controlled airspace and the controller received permission to do so.



Radar picture 13.

At 07:12:50 N503AL still was flying in the controlled airspace without APP controller permission

Only at **07:14:37** crossing altitude 4300 feet the pilot of N503AL established first radio contact with the APP Controller and declared "***N503AL proceed via flight plan to point ERIVA***".



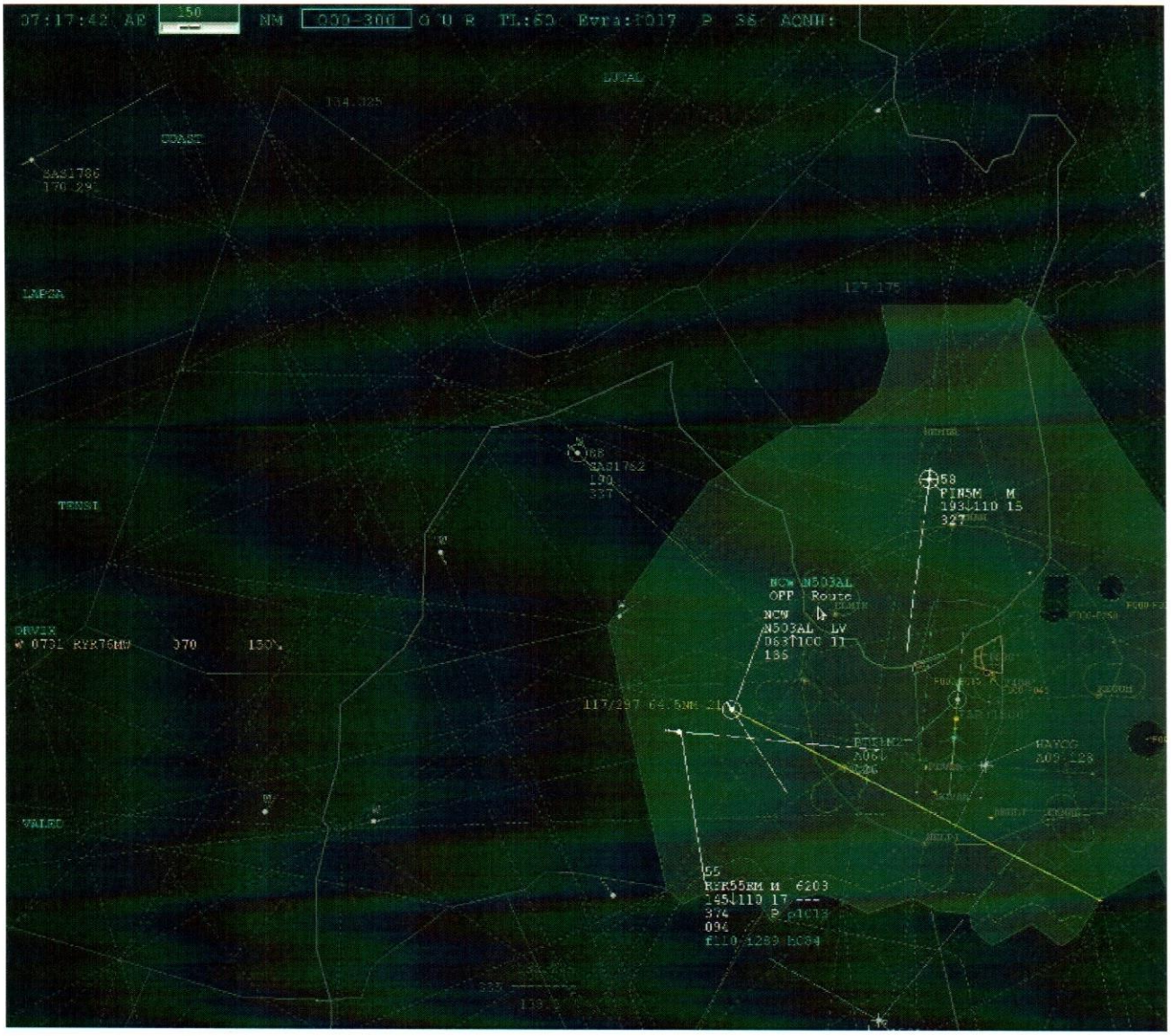
Radar picture 14.

The APP controller for identification instructed pilot of N503AL to set SQUAWK 4325 and requested to confirm about altitude what he is flying. Pilot said that FL 240 and APP controller cleared initial climb FL100 which was confirmed by N503AL pilot.

On request of APP controller the pilot of N503AL confirmed that he is flying IFR now and was cleared by controller to fly from present position direct to RIA what conformed to submitted flight plan.

After given clearance clarification the pilot confirmed instruction.

At **07:17:42** APP controller changed clearance for N503AL and gave clearance to fly direct to point ERIVA.



Radar picture 15. According to Mode S information flight level set on the N503AL is 100

Radar picture 16. STCA triggered on

When STCA triggered on APP controller instructed pilot of N503A to maintain FL 100 and warned about aircraft vicinity: "N-AL maintain flight level 100, traffic above". The pilot confirmed clearance: "Maintain 100 due to traffic". The pilot did not hold controller's authorized FL 100, continued climbing, level bust occurred and the aircraft crossed FL 108 at final.

2.3. Air traffic service´s procedures

The conduct of the air navigation service operation at Riga International airport Airport was regulated by the following policies of the air navigation service provider LGS:

- DI-GSV/GSVC-01 Air Traffic Control Centre "Approach Sector Operations Manual";
- Safety Management System Manual RG-KND/DVN-01/6.1;
- ICAO Doc 4444 Air Traffic Management;
- Annex 2 Rules of Air;
- Annex11 Air Traffic Services;
- AIP;

2.4.The application of radar control service

Radar identification is achieved according to the provisions specified by ICAO. Radar control service is provided in controlled airspaces to aircraft operating within Riga TMA above 1500 FT MSL and along all AWYs above FL 095. This service may include:

a. radar separation of arriving, departing and en-route traffic;
b. radar monitoring of arriving, departing and en-route traffic to provide information on any significant deviation from normal flight path;
c. radar vectoring when required;
d. assistance to aircraft in emergency;
e. assistance to aircraft crossing controlled airspace;
f. warnings and position information on other aircraft considered to constitute a hazard;
g. information to assist in the navigation of aircraft;

The minimum horizontal radar separations is: TMA RIGA - **3 NM** between identified controlled aircraft;

2.4.1. Control functions of Sector APPROACH controller

According to DI-GSV/GSVC-01 Air Traffic Control Centre "Approach Sector Operations Manual" that was in force at the day when incident occurred:

ATC Operational Aspects

According to ATCC duty roster on April 21, 2016 the APP Controller's working time with role as Approach Executive (AE) was from 07:30 till 15:00 local time (04:30 till 12:00 UTC) at seven hour shift No1.

At the time of the occurrence Riga FIR Sector "APPROACH" had minimum workload - 4 aircraft on frequency 129.925 MHz.

Controller had reported for duty as APP Executive (AE) and logged in the ATRACC+ system at 04:36:22 UTC and had been at her working position for 53 (fifty three) minutes and 21 sec, after that had break. After break APP controller logged in the ATRACC+ system at 06:31:50 and was in AE working position at 07:20:53 when the occurrence occurred 00 hrs 49min 03sec after break time. Break time before accident was 1hour 2min 7sec at 07:20:53, total working time 1 hour 51 min 10sec.

2.4.2. Sector "APPROACH" controller actions

When pilot of N503A contacted APP controller gave SQUAWK 4325 for aircraft identification and instructed pilot to hold initial climbing FL100.

Later pilot was instructed to change flight rout from current position direct to point RIA according to FPL, but after clarification by pilot was given repeated controller's instruction to fly direct to RIA and expect vectors for spacing.

Later for interval assurance APP controller changed descending level of approaching aircraft RYR55RM from FL70 to FL110 and declared that will call back later for further descent and pilot of N503AL was instructed to change route from current position to point ERIVA. Distance between aircraft was 9.0NM.

When STCA triggered on and warned about possible infringement of separation standards APP controller immediately interrupted communication with aircraft SAS 1762 crew and instructed pilot of N503AL to maintain

FL100 and warned about existing traffic above. At that moment horizontal interval between aircraft N503AL and RYR55RM was 1.9NM, vertical 600 FT.

3. Conclusions

During process of investigation were made the following conclusions:

3.1. Findings

- In order to maintain an overview traffic, the Air Traffic Control radar system ATRACC+ was in use;
- At the time of the incident the traffic was handled by Sector "APP" Controller Approach AE of Riga ATCC;
- Controller held valid license and ratings and was qualified and current at her position;
- Pilot of N503AL held valid license and ratings;
- Before the incident the workload of the Sector "APP" was low;
- There was not report by the pilot of aircraft N503AL of the flight plan activation and the opening of departure from an uncontrolled aerodrome;
- There was not report from pilot of N503AL on visual flight rules changes to instrument flight rules.
- There was not request from pilot of N503AL for entry into controlled airspace and the controller received permission to do so.
- According to Mode S information flight level set on the N503AL was 100.
- During flight the pilot of N503AL crossed cleared flight level 100 by APP controller and climbed to FL 108;
- Vertical separation between aircraft was 600FT, horizontal 1.9 NM;
- The minimum horizontal radar separations within TMA RIGA is **3 NM** between identified controlled aircraft, vertical 1000FT;
- There was not misunderstanding APP controller's authorized clearance by pilot of N503AL;
- The Manual "DI-GSV/GSVC-01 Air Traffic Control Centre "APPROACH SECTOR OPERATIONAL MANUAL"" that was in force at the day of incident, was not lack instructions about Controller's actions;
- Within the context of this incident there were not find lack of human resources, budget resources, deficient planning, as well as were not find any adversarial or conflicting or when they are supplanted by unofficial rules and values and confusion abounds that could to have influence on creation of this serious incident;
- At the time of incident Visual Meteorological Conditions (VMC) prevailed.

3. 2. Causes

3.2.1. Main Cause

Infringement of the horizontal and vertical separation standards was a consequence of the fact that the pilot of aircraft N503AL did not maintain (level bust) APP controller's authorized flight level 100 and climbed to FL108.

3.2.2. Contributing causes

Absence of the request from pilot of N503AL for entry into controlled airspace and the controller received permission to do so.

3.2.3. Primary cause

The event after which incident became inevitable.

Continued climbing above FL100 after controller's

4. Safety Recommendations

It is recommended to the authority responsible for air navigation services in the Riga FIR airspace VAS Latvijas Gaisa Satiksme (LGS):

Recommendation **LV 2017-001**

Inform ATCC staff about results of current investigation.

May 15, 2017

Investigator in charge — Visvaldis Trūbs

Director of Transport Accident and Incident Investigation Bureau — Ivars Alfreds Gaveika